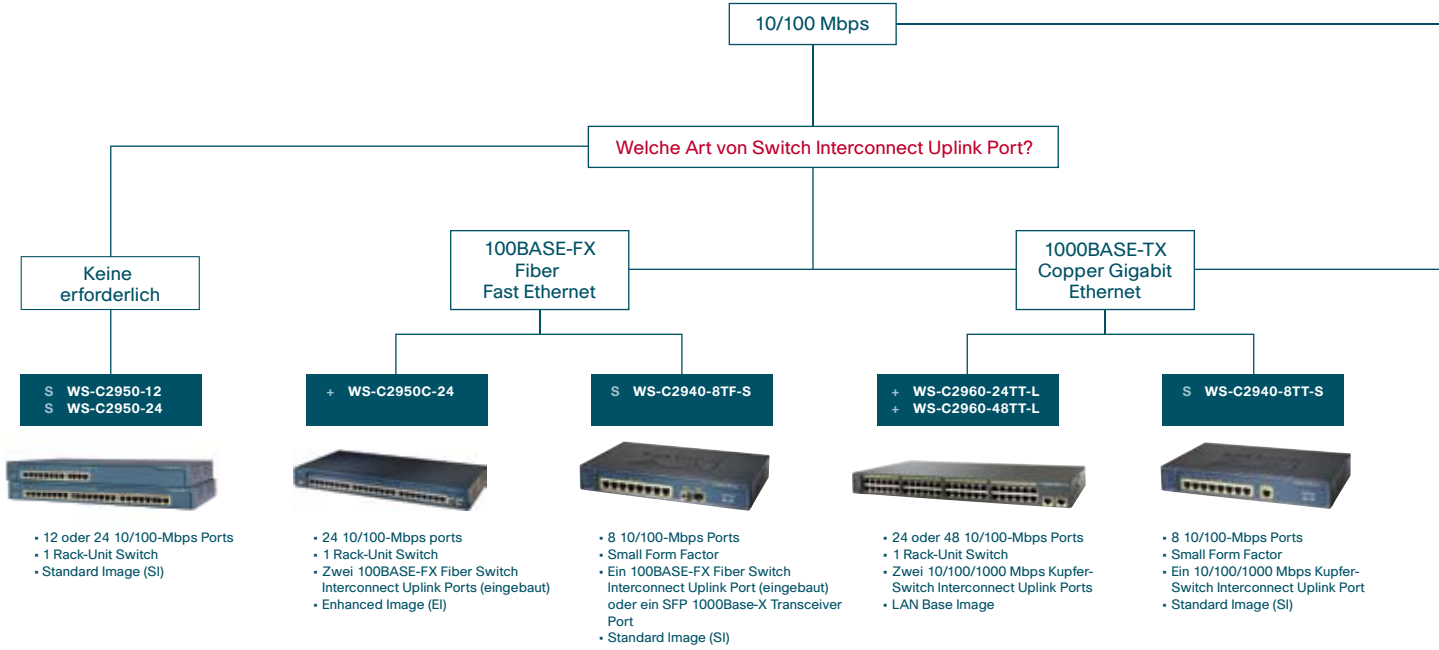
Cisco Catalyst Switches: Layer 2 Access Switches



Data Sheet

Cisco Catalyst 2940 Series Switches

The Cisco® Catalyst® 2940 Series switches are small, standalone, managed switches with eight Fast Ethernet ports and a single integrated Fast Ethernet or Gigabit Ethernet uplink. The switches are designed to be used outside the wiring closet in the end-user workspace, and feature a durable metal shell, no fan for silent operation, easy wall or under-the-desk mounting, a security lock slot to prevent theft, and an available cable guard to secure the Ethernet cables and switch.

The Cisco Catalyst 2940 Series is extremely easy to set up and configure via Cisco Express Setup, a simple Web-Based setup utility. For more advanced configuration and ongoing management, the Cisco Catalyst 2940 Series has a console port and supports remote management protocols such as Telnet, Simple Network Management Protocol (SNMP), as well as the Cisco Cluster Management Suite (CMS), which is a free Java-enabled Web-based monitoring and configuration tool that comes embedded in the switch and can manage up to 16 switches at once. Combine this with the rich functionality of Cisco IOS® Software, and these switches provide comprehensive functionality and manageability for classrooms, conference rooms, or other very small workgroup environments.

The Cisco Catalyst 2940 Series is supported by a limited lifetime warranty and free software updates for life to keep the switch current with new standards and technologies. In summary, the Cisco Catalyst 2940 Series switches provide the lowest total cost of ownership in their product class with their durable design, simple installation and management, and award-winning Cisco support.

Configurations

- Cisco Catalyst 2940-8TT:
  - Eight 10/100 ports
  - One 10/100/1000BASE-T port
- Cisco Catalyst 2940-8TF:
  - Eight 10/100 ports
  - One 100BASE-FX port and One 1000BASE-X Small Form-factor Pluggable (SFP) slot (only one active port at a time)

Accessory

- Cisco Catalyst 2940 Series Cable Guard
  - Helps prevent switch theft as well as prevent tampering or removal of Ethernet cables

Figure 1
Cisco Catalyst 2940 Series Switches

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Rich IOS Functionality

The Cisco Catalyst 2940 Series supports a Cisco IOS Software feature set that is nearly identical to that offered in the Standard Image Cisco Catalyst 2950 Series switches. This functionality provides:

- Support for network edge security to prevent unauthorized users
- Quality-of-service capabilities for basic data, video, and voice applications
- High-availability features to ensure user productivity
- Full network management support.

More details about the Cisco IOS functions are described below in Table 1. Currently, the only difference from the Cisco Catalyst 2950 Standard Image is that the 2940 Series supports only four virtual LANs (VLANs) and four Spanning Tree Protocol (STP) instances.

Product Specifications

Table 1 Product Features and Benefits

Feature	Benefit
Ease of Use and Ease of Deployment	
• Autoconfiguration	• Switch automatically downloads configuration file using Dynamic Host Configuration Protocol (DHCP).
• Autosensing	• Each non-SFP port detects the speed of the attached device and automatically configures the port for 10-, 100-, or 1000-Mbps operation, easing switch deployment in mixed 10, 100, and 1000BASE-T environments.
• Autonegotiating	• Each non-SFP port automatically selects half- or full-duplex transmission mode to optimize bandwidth.
• Dynamic Trunking Protocol (DTP)	• Switch ports automatically configure as trunks if connected to a trunk port on another switch or router.
• Port Aggregation Protocol (PAgP) and Link Aggregation Control Protocol (LACP)	• Switch ports automatically configure as Cisco Fast EtherChannel® groups or IEEE 802.3ad groups when there are multiple links to another switch, router, or server.
• DHCP Relay	• Allows a DHCP relay agent to broadcast DHCP requests to the network DHCP server.
• Default configuration	• The switch can be connected to the network and can forward traffic with no configuration.
• Auto-MDIX (media-dependent interface crossed-over) (Future)	• All ports automatically adjust transmit and receive pairs depending on cable type (cross-over or straight-through) connected.
• Express Setup	• Web browser utility allows simple switch set up so that even novices can perform a basic configuration.

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Table 1 Product Features and Benefits

Feature	Benefit
Availability/Scalability	
Superior Redundancy for Fault Backup	
• IEEE 802.1D Spanning Tree Protocol	• Ensures loop-free networks simplifies network configuration and improves fault tolerance.
• PortFast	• Transitions a port directly to forwarding state after linkup, allowing users to connect to the network in 2–3 seconds, rather than waiting ~50 seconds for spanning tree to resolve.
• UniDirectional Link Detection (UDLD) and Aggressive UDLD	• Unidirectional links automatically detected and disabled to avoid problems such as spanning tree loops; Aggressive Mode automatically retries the link periodically to see if it has returned to bidirectional.
• Switchport Autorecovery	• Automatically attempts to re-enable a link that is disabled due to a network error (also known as “errdisable recovery”).
• BPDU Guard	• Shuts down Spanning-Tree Protocol PortFast-enabled interfaces when Bridge Protocol Data Units (BPDUs) are received to avoid accidental topology loops.
• Spanning Tree Root Guard (STRG)	• Prevents edge devices not in the network administrator’s control from becoming Spanning Tree Protocol root nodes.
• UplinkFast/BackboneFast	• Ensure quick fail-over recovery enhancing overall network stability and reliability.
Bandwidth Availability	
• Per-port broadcast, multicast, and unicast storm control	• Prevents faulty end stations from degrading overall systems performance.
• Per VLAN Spanning Tree Plus (PVST+)	• Allows for Layer 2 load sharing on redundant links to utilize the full capacity of a redundant design.
• VLAN Trunking Protocol (VTP) pruning	• Limits bandwidth consumption on VTP trunks by limiting broadcast traffic only to trunk links required to reach the destination devices.
• Internet Group Management Protocol (IGMP) Snooping	• Provides bandwidth-intensive multicast traffic to only the requestors, rather than flooding all ports. Support for IGMP version 1 and 2.
• IGMP immediate-leave processing	• Faster than normal multicast leave processing, this prunes out unnecessary multicast traffic immediately after a leave request.
• Multicast VLAN Registration (MVR)	• Allows multicast streams in a single networkwide multicast VLAN while subscribers remain in separate VLANs for bandwidth and security reasons.
Quality of Service/Control	
Advanced Quality of Service	
• Honor 802.1p class of service (CoS)	• Ability to prioritize traffic and put it in different queues.
• Mark/override 802.1P CoS per port	• Network administrator can enforce QoS policies, and prevent users from abusing QoS settings.
• 4 egress queues per port	• Enables network traffic to be put into 4 different queues, depending on the CoS priority.
• Weighted Round Robin (WRR) scheduling	• High priority queues can be allocated more time to send traffic. However, WRR also ensures lower priority queues are not neglected.
• Strict Priority scheduling	• Guarantees that the highest-priority packets are serviced ahead of all other traffic. Particularly useful for time-sensitive applications like voice over IP.

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Table 1 Product Features and Benefits

Feature	Benefit
Security	
Network Management Security	
• VLAN1 minimization	• Allows VLAN1 to be disabled on any individual VLAN trunk link.
• TACACS+ and RADIUS Authentication	• Terminal Access Controller Access Control System Plus (TACACS+) and Remote Authentication Dial-In User Service (RADIUS) authentication enable centralized control of switch administration and management.
• Multilevel management levels	• Allows for 15 levels of switch management authorization, ranging from read-only to full read/write capabilities.
Network Edge Security	
• IEEE 802.1x	• Allows dynamic, port-based security, providing user authentication.
• Voice VLAN 802.1x bypass	• Permits an IP phone to access the voice VLAN irrespective of the authorized or unauthorized state of the port.
• Private VLAN Edge	• Provides security and isolation between switch ports, which helps ensure that users cannot snoop on other users' traffic.
• SPAN for IDS	• Bidirectional data support on the Switched Port Analyzer (SPAN) port allows Cisco Secure Intrusion Detection System (IDS) to take action when an intruder is detected.
• MAC address notification	• Allows administrators to be notified of users added to or removed from the network. Good for tracking location of users or stolen laptops.
• Port security	• Secures the access to an access or trunk port based on MAC address. After a specific timeframe, the aging feature removes the MAC address from the switch to allow another device to connect to the same port.
• Autotrusted boundary	• Ability to trust the QoS priority settings if an IP phone is present and to disable the trust setting in the event that the IP phone is removed, thereby preventing a malicious user from overriding prioritization policies in the network.
• IGMP filtering	• Provides multicast authentication by filtering out non-subscribers and limits the number of concurrent multicast streams available per port.
• Dynamic VLAN Assignment	• Using VLAN Membership Policy Server (VMPS) client functionality, ports can be assigned to VLANs based on the MAC address connected to the port or a user login (using the CiscoWorks User Registration Tool).

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Table 1 Product Features and Benefits

Feature	Benefit
Manageability	
Superior Manageability	
• SNMPv1/2/3 (non-crypto) and robust MIB support	• Enables full management of switches via standard network management tools.
• Cisco IOS CLI	• Provides common user interface and command set with all Cisco routers and Cisco Catalyst desktop switches, minimizing training costs.
• Telnet and console access	• Telnet provides comprehensive remote in-band management, while console port enables out-of-band management.
• Service Assurance Agent (SAA)	• Facilitates service-level management by providing network response time measurements.
• 802.1q VLANs	• Up to 4 802.1Q VLANs per switch, as well as 1005 VLAN IDs. Any port can be a VLAN trunk port.
• Voice VLAN	• Simplifies IP telephony installations by keeping voice traffic on a separate VLAN for easier administration and troubleshooting.
• VTP	• Propogates VLAN and trunk configuration across all switches in the network.
• Remote Monitoring (RMON)	• For enhanced traffic management, monitoring, and analysis, the Embedded Remote Monitoring (RMON) software agent supports 4 RMON groups (history, statistics, alarms, and events). All 9 RMON groups are supported when using SPAN to mirror traffic to an RMON probe or network analyzer.
• Layer 2 Traceroute	• Eases troubleshooting by identifying the physical path that a packet takes from source to destination.
• Switch Port Analyzer (SPAN) port	• Mirrors traffic from a port or group of ports to a single destination port, where a network analyzer or RMON probe can be connected. 1 SPAN session only.
• Trivial File Transfer Protocol (TFTP)	• Reduces the cost of administering software upgrades by downloading from a centralized server.
• Network Time Protocol (NTP)	• Provides an accurate and consistent timestamp to all intranet switches.
• Multifunction LEDs per port	• For port up/down status; half-duplex and full-duplex mode; and 10BASE-T, 100BASE-TX, and 1000BASE-T indication.
• Switch-level Status LEDs	• Provides easy visual indication of system integrity status.

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Table 1 Product Features and Benefits

Feature	Benefit
Cluster Management Suite	
Web-based Management	
• Supports up to 16 switches with single IP address	• Provides an easy-to-use, Web-based management interface through a standard Web browser. Simplifies management and saves time, without the limitation of being physically located in the same wiring closet.
• 1-click software upgrade	• Entire cluster of Cisco Catalyst 2940 switches can be upgraded at once.
• Configuration cloning	• Enables rapid deployment of networks.
• Guide Mode	• Makes it easy to configure powerful advanced features by providing step-by-step instructions.
• Context-sensitive Help	• Saves time by providing help on the feature currently being used.
• Topology map	• Provides a view of up to 16 switches interconnected and their up/down status, and link speeds and settings.
• Front panel view	• Provides a front panel view of up to 16 switches and their up/down status of ports. Also can be used to select ports across all the switches to be configured simultaneously.
• Multidevice and multiport configuration	• Saves time and resources.
• Cisco Aironet® Wireless Access Point Management	• Web-based management for Aironet devices can be launched by clicking the relevant icon in the topology map.
• User-personalized interface	• Customize polling intervals, table views, and other settings within Cisco CMS Software and retains these settings.
• Alarm notification	• Automated e-mail notification of network errors and alarm thresholds.
CiscoWorks Support	
• Supported by CiscoWorks LAN Management Solution (LMS), Access Control Server (ACS), Small Network Management Solution (SNMS), and CiscoWorks for Windows	• CiscoWorks network-management software provides management capabilities on a per-port and per-switch basis, providing a common management interface for all Cisco routers, switches, hubs, and other Cisco devices. The CiscoWorks tools save time and reduce human errors.
• Cisco Discovery Protocol (CDP) v1, v2	• Enable a CiscoWorks network-management station to automatically discover and map switches.

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Table 2 Hardware Specifications

Description	Specification
Performance	• 3.6 Gbps maximum forwarding bandwidth • 2.7 Mpps wire-speed forwarding rate (based on 64-byte packets) • 16 MB DRAM and 8 MB Flash memory • Configurable up to 8000 MAC addresses • Configurable up to 255 multicast groups • Configurable maximum transmission unit (MTU) of up to 1500 bytes • 4 802.1Q VLANs • 1005 VLAN IDs
100BASE-FX fiber-port power levels	Optical transmitter wavelength: 1300 nm (nanometer) Optical receiver sensitivity for 50/125-micron cabling: –33.5 to –11.8 dBm (decibel milliwatt) Optical receiver sensitivity for 62.5/125-micron cabling: –33.5 to –11.8 dBm Optical transmitter power for 50/125-micron cabling: –23.5 to –14 dBm Optical transmitter power for 62.5/125-micron cabling: –20 to –14 dBm
Connectors and cabling	• 10BASE-T ports: RJ-45 connectors; 2-pair Category 3, 4, or 5 unshielded twisted-pair (UTP) cabling • 100BASE-TX ports: RJ-45 connectors; 2-pair Category 5 UTP cabling • 1000BASE-T ports: RJ-45; 2-pair Category 5 UTP cabling • 100BASE-FX ports: MT-RJ connectors, 50/125 or 62.5/125 micron multimode fiber-optic cabling • 1000BASE-SX, -LX/LH, -T SFP-based port: LC fiber connectors, single-mode or multimode fiber, and RJ-45 connector for copper • Management console port: Use RJ-45-to-DB9 cable for PC connections
Power connectors	• The internal power supply is an autoranging unit, supporting input voltages between 100 and 240 volts alternating current (VAC) • Use the supplied AC power cord to connect the AC power connector to an AC power outlet
Indicators	• Per-port status LEDs: link integrity, disabled, activity, speed, and full-duplex indications • System-status LED
Dimensions	(H x W x D) 1.55 x 10.6 x 6.42 in. (3.94 x 26.92 x 16.3 cm)
Weight	3 lb (1.36 kg)
Environmental Ranges	• Operating temperature 32 to 113 F (0 to 45 C) • Storage temperature –13 to 158 F (–25 to 70 C) • Operating humidity 10 to 85% (noncondensing) • Operating altitude up to 10,000 ft (3000 m) • Storage altitude up to 15,000 ft (4570 m)
Acoustic Noise	International Organization for Standardization (ISO) 7779: bystander position operating to an ambient temperature of 30 C: 0 decibels (dB)
Telco CLEI Code	• 2940-8TF: CNMEG00ARA • 2940-8TT: CNMEH00ARA

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Table 2 Hardware Specifications

Description	Specification
Mean Time Between Failure (MTBF)—Predicted	• 2940-8TF: 636,000 hrs (73 yrs) • 2940-8TT: 771,000 hrs (88 yrs)
Warranty	• Limited lifetime warranty

Table 3 Power Specifications

Description	Specification
Power Consumption	15W (maximum) 50 Btus per hour
AC input voltage/frequency	100 to 240 VAC (autoranging), 50 to 60 Hz

Table 4 Management and Standards Support

Description	Specification
Management Information Bases (MIBs)	BRIDGE-MIB.my ENTITY-MIB.my CISCO-2900-MIB.my CISCO-CDP-MIB.my CISCO-CONFIG-MAN-MIB.my CISCO-IMAGE-MIB.my CISCO-MEMORY-POOL-MIB.my CISCO-PING-MIB.my CISCO-PRODUCTS-MIB.my CISCO-TCP-MIB.my IF-MIB (RFC 1573) OLD-CISCO-CHASSIS-MIB.my OLD-CISCO-CPU-MIB.my OLD-CISCO-INTERFACES-MIB.my OLD-CISCO-IP-MIB.my OLD-CISCO-MEMORY-MIB.my OLD-CISCO-SYSTEM-MIB.my OLD-CISCO-TCP-MIB.my OLD-CISCO-TS-MIB.my RFC1213-MIB (MIB-II) RFC1398-MIB (ETHERNET-MIB) RMON-MIB (RFC 1757)- 4 Groups SNMPv2-MIB.my TCP-MIB.my UDP-MIB.my CISCO-VLAN-MEMBERSHIP-MIB.my CISCO-SMI.my CISCO-TC.my CISCO-VTP-MIB.my IANAifType-MIB.my

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Table 4 Management and Standards Support

Description	Specification
Management Information Bases (MIBs)	RS-232-MIB.my SNMPv2-SMI.my SNMPv2-TC.myCISCO-STP-EXTENSIONS-MIB.my CISCO-CLUSTER-MIB.my CISCO-FLASH-MIB.my CISCO-PROCESS-MIB.my CISCO-MAC-NOTIFICATION-MIB.my CISCO-PAGP-MIB.my CISCO-IGMP-FILTER-MIB CISCO-RTTMON-MIB CISCO-BULK-FILE-MIB CISCO-CONFIG-COPY-MIB CISCO-ENVMON-MIB CISCO-FTP-CLIENT-MIB CISCO-SYSLOG-MIB CISCO-STACKMAKER-MIB CISCO-PORT-SECURITY-MIB.my
Standards	IEEE 802.1x IEEE 802.3ad IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports IEEE 802.1D Spanning-Tree Protocol IEEE 802.1p CoS Prioritization IEEE 802.1Q VLAN IEEE 802.3 10BASE-T specification IEEE 802.3u 100BASE-TX specification IEEE 802.3ab 1000BASE-T specification IEEE 802.3z 1000BASE-X specification 1000BASE-SX 1000BASE-LX/LH RMON I and II standards SNMPv1, SNMPv2c, SNMPv3 (non-crypto)

Table 5 Compliance

Safety certifications	• UL to UL 60950, Third Edition • C-UL to CAN/CSA C22.2 No. 60950-00, Third Edition • TUV/GS to EN 60950:2000 • CB to IEC 60950 with all country deviations • NOM to NOM-019-SCFI • CE Marking

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Table 5 Compliance

Electromagnetic Compatability	• FCC Part 15 Class A • EN 55022: 1998 (CISPR22) • EN 55024: 1998 (CISPR24) • VCCI Class A • AS/NZS 3548 Class A • CE • CNS 13438 Class A • MIC

Service and Support

Cisco Systems® is committed to minimizing total cost of ownership (TCO). Cisco offers a portfolio of Technical Support Services to help ensure that Cisco products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in the table below are available as part of the Cisco Desktop Switching Service and Support solution, and are available directly from Cisco and through resellers.

Table 6 Service and Support Products, Features, and Benefits

Service and Support	Features	Benefits
Advanced Services		
Cisco Total Implementation Solutions (TIS), available direct from Cisco Cisco Packaged TIS, available through resellers	• Project management • Site survey, configuration, and deployment • Installation, test, and cutover • Training • Major moves, adds, and changes • Design review and product staging	• Supplements existing staff • Ensures functions meet needs • Mitigates risk
Technical Support Services		
Cisco SMARTnet™ and SMARTnet Onsite, available direct from Cisco Cisco Packaged SMARTnet, available through resellers	• 24-hour access to software updates • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center (TAC) • Advance replacement of hardware parts	• Enables proactive or expedited issue resolution • Lowers TCO by taking advantage of Cisco expertise and knowledge • Minimizes network downtime

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Table 7 Ordering Information

Product Number	Product Description
WS-C2940-8TF-S	• 8 Ethernet 10/100 ports + 1 Ethernet 100BASE-FX + 1 1000BASE-X SFP port (1 uplink active at a time) • Wall-mountable, standalone, managed switch
WS-C2940-8TT-S	• 8 Ethernet 10/100 ports + 1 Ethernet 10/100/1000BASE-T • Wall-mountable, standalone, managed switch
CABLEGUARD-C2940=	• Cable Guard for the Cisco Catalyst 2940 Series Switches secures switch and prevents tampering with Ethernet cable jacks

Table 8 Compatible Small Form-Factor Pluggable (SFP) Transceivers for the Cisco Catalyst 2940-8TF Switch

Product Number	Product Description
GLC-LH-SM=	1000BASE-LX/LH Gigabit Ethernet SFP, LC connector, LH transceiver
GLC-SX-MM=	1000BASE-SX Gigabit Ethernet SFP, LC connector, SX transceiver

Table 9 Compatible Fiber Patch Cables for the Cisco Catalyst 2940-8TF Switch MT-RJ Connectors

Product Number	Product Description
CAB-MTRJ-SC-MM-1M=	1-meter, MT-RJ-to-SC multimode cable
CAB-MTRJ-ST-MM-1M=	1-meter, MT-RJ-to-ST multimode cable
CAB-MTRJ-SC-MM-3M=	3-meter, MT-RJ-to-SC multimode cable
CAB-MTRJ-ST-MM-3M=	3-meter, MT-RJ-to-ST multimode cable
CAB-MTRJ-SC-MM-5M=	5-meter, MT-RJ-to-SC multimode cable
CAB-MTRJ-ST-MM-5M=	5-meter, MT-RJ-to-ST multimode cable

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